

ATTACHMENT #1



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General Letter to Airports, Authorities, Operators and Suppliers

Use of Runway De-Icers - Potassium Formates/Acetates Corrosion on Aircraft.

Since 1997 a serious problem of catalytic oxidation has been occurring on aircraft using carbon brakes.

The requirement for the use of carbon brakes originated in various weight-saving initiatives by aircraft manufacturers during which steel brakes were replaced by carbon brakes and new aircraft were delivered with carbon brakes.

In 1997 because of a concurrent initiative by airports, to improve or control their environmental pollution, a change in the use of runway de-icing fluids took place in favour of more environmentally mild products.

This resulted in the use of potassium based products containing potassium formates and/or acetates. These chemicals (organic salts) attack the carbon in the brake and unfortunately create a catalytic oxidation which softens the carbon causing it to flake and crumble undetected and unpredictably over time thus reducing the life and long-term efficiency of the brakes themselves. There is therefore a safety issue involved, namely that of a brake failure during high-speed aborted take-off and the possibility of a brake/wheel fire from hydraulic fluid released during that failure.

In 2002 Transport Canada Civil Aviation issued Aerodrome Safety Circular ASC 2002-015, which describes the situation regarding the severity of potassium formate reaction and advising that airports should not use it. At that time the circular was pointed towards electrical connection and followed a Boeing Advisory form 2001. FAA also had issued a similar advisory at around the same time.

Since then it appears that Formates also attack carbon and potassium acetates also add to the problem. Worst case for carbon is acetates, second worse is formates.

SAE G-12F, among other Industry working groups, have been working for some time to try and reduce these effects from runway de-icers used by airports, which not only reduce aircraft safety but also enormously increase costs (maintenance, cost of ownership and, of course, eventually passenger costs), in fact it is becoming apparent that perhaps hundreds of millions of dollars of industry usable revenue have been lost over the last ten years on this particular issue. Airports, themselves, are also experiencing costs related to the use of these fluids, we understand.

During winter, snowplough activity leaves fairly large amounts of fluid and slush on runways because snowplough drivers lower the plough blade to within half an inch (15 mm.) of the runway surface, leaving the last part to be dealt with by the runway de-icing fluids, even though some airports use a broom wagon to follow the plough and sweep the slush, there will still be heavy elements of spray from what's left and further precipitation just adds to the problem.

Unfortunately this causes a very wet, fluid (potassium) impregnated runway surface. The fluid is sprayed over and under the aircraft landing and taking off, where it causes various types of corrosion.

On aircraft during take-off and landing roll, the spray is often taken onto the undercarriage, particularly the centre parts, where it builds into fairly solid ice because of the reduction of chemical action of the de-ice fluid.

When the aircraft takes off again, the undercarriage legs/wheels are pulled up into the undercarriage bay. At this point the ice on the undercarriage melts and runs down onto the brake units and onto/into the carbon disks. This fluid comprises water and potassium-formates and/or acetates, perhaps both as airports do not all use the same de-icing fluids.

In the same way many aircraft have the additional issues of Cadmium corrosion, aluminium corrosion, corrosion in landing gear joints, and electrical wire bundle degradation, also caused or accelerated by the same fluids, which, again, is a further unaccounted for expense.

In addition, there is the enormous cost associated with premature and severe GSE equipment corrosion attributed to the runway and ramp fluids applied by the airports. These runway fluids are now being found to adversely affect anti-icing fluid applied to aircraft and also to promote the formation of anti-icing fluid residue gel in aerodynamically quiet areas of the aircraft.

As an immediate short-term goal, the co-chair party of the SAE G-12F Catalytic Oxidation Working Group is now approaching all Airports, Airlines and Authorities, De-Icing Fluid Manufacturers, and Carbon Brake Manufacturers, to discuss what can be done, to the **mutual** benefit of all, perhaps by using those fluids, which, on record, are causing less corrosion in all 'areas', finding other fluids - all solutions are welcomed.

Airbus and Boeing believe that, because the issue is wide and varied and the common denominator in every entity's problem appears to be the use of one type of material having an effect on many materials that an Industry meeting would be the best way to begin to promote the discussion. We are therefore requesting a response from all parties with regard to an appropriate time and venue for this meeting and some commitment in helping to find solutions to the issue. With regard to a venue, any organisation willing to provide the use of its facilities would also be appreciated.



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